

Characterization of Chemical Functional Groups and Different Type of Organic Matters by FTIR-ATR Analyses

Chen Yen Yu* and Ying Ju Chang
National Taiwan Ocean University, Taiwan

Organic matters, such as oil, coal, kerogen, amber have different chemical functional groups. The complexity of chemical functional groups derives from the many sources of original contributing organic matter and long-term chemical and physical changes over geologic time. Fourier Transform Infrared Spectrometer-Attenuated Total Reflectance (FTIR-ATR) can quantify the abundance of chemical functional groups and is a sensitive, high resolution and non-destructive analytical technique. The aim of this study was to characterize the spectral behavior and chemical structural of organic matters. In order to correlate organic matters of different types with its infrared spectra. The results show that FTIR-ATR spectra of oil contain intense aliphatic C-H stretching vibration in 2960 cm^{-1} , 2925 cm^{-1} , 2850 cm^{-1} region relative to the C-H (CH_3) scissoring vibration at 1380 cm^{-1} and C=C aromatic ring stretching vibration at 1640 cm^{-1} . This FTIR-ATR measurement of oil was well-correlated to API value and Asphaltene determined. In this study, we apply FTIR-ATR analyses for evaluating oil potential of kerogens. The results show that kerogen of type I has clear obvious C-H stretching vibration absorption peaks was observed at 2925 cm^{-1} , 2850 cm^{-1} and C=C stretching vibration at 1640 cm^{-1} relative to Type II. It means C-H and C=C stretching bend are oil potential indicator. In Type III, the absorption peaks were significantly observed at 1470 cm^{-1} corresponding to the C-H scissoring vibration and lower absorbance of CH and CH_2 stretching vibrations at 2925 cm^{-1} , 2850 cm^{-1} . It may be means low oil potential. In analyzing of amber, similar locality of ambers have similar chemical vibration ratio of C-H vibration (2925 cm^{-1} , 2850 cm^{-1}) and C-H (1470 cm^{-1}). It may means same locality of amber. In consequence, the analysis providing a rapid means of assessing organic matters and oil potential.

Biography:

Chen Yen Yu is a Master student at the Institute of Earth Sciences of National Taiwan Ocean University in Taiwan. Chen Yen Yu research focus on the assessment of organic matters by FTIR-ATR analysis. Chen Yen Yu had attended an internship to study Seismic survey, well logging Interpretation and Applications, core describing, GC-MS analysis, extraction of samples in CPC (CPC Corporation, Taiwan).